

Response to Amendment

1. Applicant's RCE of December 15, 2009 has been entered and fully considered.
2. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

4. Claims 16, 19-21, 32, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable Tamaki et al. in view of Nally (US Patent 5,484,108) and Pontoppidan (US Patent 6,267,307).

Tamaki et al. discloses a fuel injector comprising: a fuel inlet; a movable valve closure member 2; a fixed valve seat 1 as recited; and a downstream valve end including an outlet component 3 and a fuel outlet, wherein the fuel outlet includes at least one discharge orifice 4 of the outlet component, the outlet component being flat and disk-shaped and is arranged directly downstream of the valve seat and is permanently joined to the valve seat, the discharge orifice being inclined as recited and ends in an outlet area in which the outlet area is a most downstream portion of the valve end. Nally '108 teaches a fuel injector comprising a valve closure member 38, an outlet component 26 directly downstream of a seat 18 and having an orifice 50 inclined at an angle relative to the longitudinal axis of the valve, in which the orifice ends in an outlet area configured as a convexly-arched spray-discharge region (including dome 52 and space 46 shown in Fig. 8) that extends beyond the outlet component in a downstream direction and the

outlet area including a spray-discharge region thickness greater than a peripheral thickness of the outlet component. Pontoppidan teaches a fuel injector comprising a movable valve-closure member 9 and a fixed valve seat element to cooperate with the valve-closure member to open and close a valve in which the seat has an outlet that includes a coating 14 around the discharge orifice including in an immediate exterior of an outlet area of the discharge orifice to protect against scaling. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Tamaki et al. by replacing the outlet component with the outlet component as taught by Nally '108 since the device will still function properly with such an arrangement and by providing a coating around at least one discharge orifice as taught by Pontoppidan to protect against scaling.

5. Claims 22-25 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaki et al. in view of Nally and Pontoppidan as applied to claim 16 above, and further in view of Fedorovich et al.

Fedorovich et al. teaches coating internal combustion engines with fluorosilicate to improve heat resistance of the various surfaces of the engines. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the prior art device by providing a coating comprising fluorosilicate as taught by Fedorovich et al. in order to provide heat resistance also. The actual coating area would have been a matter of design choice depending on the required coverage area and the method of spraying or dipping as recited in claim 24 would have been a matter of production preference since both methods are known in the art.

6. Claims 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaki et al. in view of Nally and Pontoppidan as applied to claim 16 above, and further in view of Egizi.

Egizi teaches a fuel injector comprising a movable valve closure member 20, a seat 29, a swirl element 28 upstream of the seat, and a guide 31 to guide a movable valve closure member 20. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the prior art device by providing a swirl element as recited since Egizi has already taught a fuel injector with such arrangements. The method of producing the swirl element as recited in claim 29 would have been a matter of manufacturing choice.

7. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaki et al. in view of Nally and Pontoppidan as applied to claim 16 above, and further in view of Kaska.

Kaska teaches a fuel injector having parts coated with nickel. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the prior art device by providing a coating comprising nickel as taught by Kaska.

8. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaki et al. in view of Nally and Pontoppidan as applied to claim 16 above, and further in view of Danckert et al.

Danckert et al. teach a fuel injector having parts coated with titanium nitride. It would have been obvious to one having ordinary skill in the art at the time the invention was

made to have modified the prior art device by providing a coating comprising titanium nitrite as taught by Danckert et al.

9. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaki et al. in view of Nally and Pontoppidan as applied to claim 16 above, and further in view of Coffinberry et al.

Coffinberry et al. teach a fuel injector having parts coated with tantalum oxide. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the prior art device by providing a coating comprising tantalum oxide as taught by Coffinberry et al.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davis Hwu whose telephone number is (571)272-4904. The examiner can normally be reached on Mon-Friday 8:00-4:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on (571)272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

/Davis Hwu/
Primary Examiner, Art Unit 3752